NOTES.

Mons. J. Vallot has recently sent to his correspondents a reprint from the *Revue Illustrée* for July 1, 1904, containing a fully illustrated account of his scientific work on Mont Blanc, with views of his meteorological observatories, and a bibliography of his publications.

A relation between sunspots and thunderstorm frequency at Vienna is set forth by G. Walter, in *Das Wetter* for December, 1904. The author believes that a year with few thunderstorms almost always precedes a year of sun-spot maximum. These results do not agree with those obtained some years ago by von Bezold; in fact, there is a very considerable diversity of opinion in regard to almost all the relations between solar and meteorological phenomena. R. DeC. Ward.

EUGENE G. BLACKFORD.

Eugene G. Blackford, who died recently, was known to American zoologists for his many-sided and practical contributions to the study of fish and shell-fish. He was for a long time associated with the United States Commission of Fisheries, and was a supporter of Professor Baird in his efforts to create the national commission: he was Commissioner of Fish and Fisheries of the State of New York from 1879 to 1892, and it was under his administration that many measures were taken with regard to the stocking of waters and the protection of fish. The survey and renting of the state oyster-grounds, it may be mentioned, was due to his initiative. He devoted himself particularly to applying scientific results to practical purposes, and his efforts in promoting fish-hatching, in introducing new and serviceable species of fish, in stocking waters, and in devising new methods for catching, preserving, shipping, and storing fish, had a permanent effect upon the markets of the country; he frequently brought to the consumer fish which were new to him, sometimes even new to science, such, for example, was the red snapper, *Lutjanus blackfordi*. In 1881 he was instrumental in founding the state fish hatchery at Cold Spring Harbor; in 1890 he established there, under the auspices of the Brooklyn Institute of Arts and Sciences, a biological station, which developed successfully and has recently been adopted by the Carnegie Institution. As early as 1877* he mooted the establishment of a New York aquarium and he later designated the Battery building as a suitable nidus for its growth. He was the first, as far as I am aware, to make this practical suggestion, and to his efforts and influence no small part of the success is due in creating the present institution. He was most influential in supporting the establishment of the museum of the Brooklyn Institute of Arts and Sciences, and in the latest time he took a prominent part in creating in Brooklyn a teaching museum for children.

The following are the more important of Mr. Blackford's publications:

1876. 'On the Need to Obtain Statistical Studies of Fish Catches in the United States.' *Report of American Fish Culturists' Association,* V. meeting, p. 5.

1877. 'Reference to the Length of Time Milt of Salmon Could be Kept Successfully.' *Ibid.,* VI. meeting, p. 99.

1877. 'Introduction of Pompano into the Northern Markets.' *Ibid.,* p. 124.

1878. 'Peculiar Features of the Fish Market.' *Ibid.,* VII. meeting, p. 77.

1879. 'Whitebait in American Waters.' *Ibid.,* VIII. meeting, p. 11.

1882. 'Report on the Merits of the Rainbow Trout.' *Ibid.,* XI. meeting, p. 23.

1883. 'On the Size of Marketable Lobsters.' *Ibid.,* XII. meeting, p. 414.

1883. 'A Few Facts in Relation to the Food and Spawning Season of Fishes on the Atlantic Coast.' *Ibid.,* XIII. meeting, p. 5.

1883. 'Regarding the Pollution of the Water of New York Bay.' *Ibid.,* p. 73.

1884. 'Is Legislation Necessary for the Propagation of the Ocean Fisheries.' *Ibid.,* XIII. meeting, p. 60.

* He referred to the 'necessity of an aquarium in New York City'; and he expressed the hope 'that a public enterprise might be started which would be a free public institution.' 'Report of the Am. Fish Culturists' Association,' 1877, p. 107.

1885. 'The Oyster Beds of New York.' *Ibid.*, XIV. meeting, p. 85.

1885. 'Report of the Commissioner of Fisheries of the State of New York in Charge of Oyster Industry,' pp. 70.

1886. *Ibid.*, II. report, pp. 23.

1886. 'Report of the Commissioner of Fisheries of the State of New York.' XIV. report, p. 7.

1887. *Ibid.*, 'Oyster Industry.' III. report, pp. 27.

1887. *Ibid.*, XV. report, pp. 17.

1888. *Ibid.*, XVI. report, pp. 30.

1899. 'On the Spawning Season of the Eel.' SCIENCE, N. S., Vol. IX., p. 741.

BASHFORD DEAN.

COLUMBIA UNIVERSITY,
January 25, 1905.

ILLINOIS RIVER PLANKTON.

THE Illinois State Laboratory of Natural History has published, as Article II. of the sixth volume of its Bulletin, a report on the results of a virtually continuous study of the minute plant and animal life, or plankton, of the Illinois River and its tributary waters, carried on for five successive years by the staff of the Illinois Biological Station. This makes a volume of 534 pages, illustrated by 2 maps, 11 half-tone plates, and 37 full-page diagrams.

Opening with an elaborate description of the Illinois River and its drainage basin, this report treats of the effect of variations of temperature and peculiarities of chemical condition on the life of the stream, and presents at length and in detail a comparative study of 630 plankton collections made from the river at Havana, from one of its tributaries which empties into it at that point, and from five bottom-land lakes of various character and variously related to the main stream. These collections were so made, at regular intervals, with identical apparatus, and by a uniform method, that they can be compared with each other quantitatively, and may be used as the basis of general conclusions concerning the system of minute life in these waters, from season to season and from year to year.

It appears from these studies that the plankton is distributed in the main stream of the Illinois River about as evenly as it is in the stationary waters of a lake, and that generalizations based on an examination of a small part of it are consequently as reliable as those concerning that of a lake. The ratio of the plankton of the river, year in and year out, was 2.7 parts per million of the water in the stream, and its total average amount moving down stream past any given point reached the astounding aggregate of 75,000 tons per annum, or 8.5 tons an hour. This is about 15 times the total weight of the fish taken from the river in a year.

The production of the plankton falls to its minimum, as a rule, in January and February, and reaches its maximum in April, May, and June. Floods, of course, dilute it, and falling waters concentrate it, but, on the other hand, a season of general high water increases its total quantity, and a season of general low water decreases it. Light and heat favor its development, and it is consequently more abundant, other things being equal, in a season during which clear and warm weather preponderates than in a cold and cloudy one. The freezing of the river does not seriously affect it, unless the ice-sheet continues until the water becomes foul with the gases of decay. The addition of sewage to the river water greatly increases the production of this minute life by increasing the supply of available food, although an excessive amount of sewage may render the water too foul for it at the point of discharge.

The production of plankton is less in short streams with relatively swift current than in long streams with slow current, and short tributaries consequently tend to dilute the plankton of the main stream. On the other hand, the stagnant and relatively permanent waters of shallow lakes bear a more abundant plankton than the temporary waters of flowing streams, and the outflow from such lakes hence enriches the plankton of the river. Parts of a stream with many small tributaries will contain less plankton than those with which numerous lakes are connected.

The bottom-land lakes differ widely in the amount of plankton which they contain, this